G. von Koch.—Dr. H. von Ihering's contribution to the anatomy of Chiton deals chiefly with the sexual apparatus, the kidney, and the muscles. He show that in Chitonidæ the sexes are undoubtedly separate, and that the ova are fertilised in the ovary.—Observations on the formation, fertilisation, and segmentation of the animal egg, by Oscar Hertwig, part 3, 20 pages, 3 plates. This part deals with the ova of the star-fish, Asteracanthion.

Zeitschrift für wissenschaftliche Zoologie, vol. xxx. part 2.—Contribution to the knowledge of the flagellate infusorians and some related organisms, by O. Bütschli, 78 pp. 5 plates, describing or criticising a great number of species.—On the lungs of *Birgus latro* (land crab), by C. Semper.—The copulatory organs of plagiostomes, by K. R. Petri, 48 pp. 3 plates.—The central nervous system of the alligator, by Rabl-Rückard, 38 pp. 2 plates.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, March 28.—"Measurements of Electrical Constants. No. II. On the Specific Inductive Capacities of Certain Dielectrics," by J. E. H. Gordon, B.A. Camb. First Series. Communicated by Prof. J. Clerk Maxwell, F.R.S. (Abstract.)

The author has, under Prof. Clerk Maxwell's directions, carried out some measurements of specific inductive capacities by a new method.

The author finds that all his results are much lower than those obtained by previous experimenters, and suggests that the fact may perhaps be explained on a supposition that the specific inductive capacity of dielectrics increases from an inferior to a superior limit during the first small fraction of a second after the commencement of the electrification. He discusses this question at some length in his paper.

"On the Thermo-Electric Properties of Liquids," by G. Gore, LL.D., F.R.S.

In this communication the author has described an improved apparatus for examining the thermo-electric properties of liquids, by the use of which, with the precautions stated, all sources of error in such experiments appear to be removed; he has also described a number of experiments he has made with it, and the results obtained.

By employing a sufficient number and variety of electrically-conducting solutions, of acids, salts, and alkalies, in those experiments, he has discovered several exceptions to the usual effect he had formerly obtained, viz., that acid liquids are thermo-electro-positive, and alkaline ones thermo-electro-negative, and has sketched a diagram representing the thermo-electric behaviour of heated platinum in three of the exceptional liquids.

Reasoning upon the satisfactory results obtained, he concludes:—(1) That the electric currents are not produced by chemical action; (2) Nor by a temporary disassociation of the constituents of the liquid; (3) Nor by the action of gases occluded in the metals; (4) But that they are produced purely and solely by the heat, and that heat disappears in producing them; (5) That they are immediate or direct effects of the heat, and that aqueous conducting liquids, therefore, possess true thermo-electric properties; (6) That the current is a result of a difference of thermic action at the surfaces of the two pieces of metal; (7) That it is a product of a suitable molecular structure of the liquid, a change of such structure resulting from alteration of temperature, and a direct conversion of heat into electricity; and (8) That the circumstance which is most influential in enabling heat to produce the currents, and most determines their direction and amount, is a suitable molecular structure of the *liquid*.

By means of the apparatus and process described, he has discovered irregular molecular changes in several of the liquids examined; and as molecular changes are the bases of various physical and chemical alterations, he suggests the use of this apparatus and method as a new one for discovering anomalous molecular alterations, and other coincident physical and chemical ones, in electrically conducting liquids; and for detecting differences of electric potential between metals and liquids at different temperatures.

By reasoning upon the different results obtained, he concludes also as probable, that when a piece of metal is simply immersed in a suitable liquid, a change of temperature occurs; and this (if correct[1]) is a parallel fact to that of the production of electricity by simple contact only. The results also support the contact theory of voltaic electricity.

The paper concludes with several suggestions of new lines of research suggested by the experiments, one of which is the construction of a new thermo-electro-motor.

Chemical Society, March 30.—Anniversary meeting.—Dr. Gladstone, president, in the chair.—The following is a brief summary of the president's address:—The bye-laws have been thoroughly revised. Successful efforts have been made to expedite the publication of the *Journal*, and a sub-editor, Mr. C. E. Groves, has been appointed. The Research Fund now amounts to 4,000*l.*, and already two papers have resulted from the assistance rendered by it to investigators. The President hopes that many chemists, especially those to whom the pursuit of chemistry has become a source of wealth, will contribute to this important fund. During the past year an independent body, the Institute of Chemistry of Great Britain and Ireland has been formed and incorporated; its objects, which are quite distinct from those of the Chemical Society, are the encouragement of the study of chemistry and the maintenance of the profession on a sound and satisfactory basis. Sixty-five papers have been read during the past session, and two lectures have been delivered. There are at present 965 Fellows. The Society has lost by death one eminent foreign member, M. Regnault, and, besides, Messrs. R. Apjohn, J. J. Griffin, W. Gossage, T. Hall, E. L. Koch, M. Murphy, Dr. Noad, and E. F. Teschemacher. After several votes of thanks, &c., the following officers were elected for the ensuing year:—President—J. H. Gladstone, Ph.D., F.R.S. Vice-presidents—F. A. Abel, C.B., Sir B. C. Brodie, W. De la Rue, E. Frankland, A. W. Hofmann, W. Odling, Lyon Playfair, A. W. Williamson, T. Andrews, W. Crookes, F. Field, N. S. Maskelyne, H. E. Roscoe, R. Angus Smith. Secretaries—W. H. Perkin and H. E. Armstrong. Foreign Secretary—Hugo Müller. Treasurer—W. J. Russell. Council—Lothian Bell, M. Carteighe, A. H. Church, W. N. Hartley, C. W. Heaton, D. Howard, G. Matthey, E. Riley, W. A. Tilden, R. V. Tuson, R. Warington, C. R. A. Wright. During the meeting it was announced that Mr. Warren De la Rue had presented the Research Fund with the sum of 100*l.* on the condition that it should be devoted to any one important research.

Anthropological Institute, March 12.—Mr. John Evans, D.C.L., F.R.S., president, in the chair.—Prof. A. Graham Bell read a paper on the natural language of the deaf and dumb. The author stated that in most cases dumbness was merely a consequence of deafness, and does not arise from any deficiency in the vocal organs, but merely from the inability to acquire articulate language, from want of means of imitating it. This can be supplied by teaching. The dogma, "without speech, no reason," is not well founded. Deaf-mute children think in pictures. Thence they form a language of signs which, as contractions of it become understood, develops into a conventional language, but its extent is very limited. No deaf-mute has been found who had formed the idea of a Supreme Being. About the commencement of the present century the Abbé de l'Epée opened an institution for the education of deaf-mutes. The tendency of education was to render the language more and more conventional by means of contractions. Of this Mr. Bell gave many interesting examples. The result of systematic education has been to enable the deaf-mutes to form a community among themselves, using a real language, representing abstract ideas as well as mere objects. Not only so, but the language has idioms of its own; for example, the objective case comes first—thus, "the boots made the bootmaker." This is a difficulty, and perhaps a mistake in the education; it affords, however, a useful subject for anthropological inquiry into the analogy with the development of spoken language. In illustration, Mr. Bell delivered the Lord's Prayer in the sign language. The North American Indians have a sign language, the same in character, but less developed, than that of the deaf-mutes. The language of the deaf-mutes is beginning to split into dialects.

Photographic Society, March 12.—J. Glaisher, F.R.S., president, in the chair.—Papers were read by Dr. van Monckhoven on the fading of carbon prints, and the suppression of

[1] Since writing the paper he has proved, by experiment, that when a sheet of platinum is immersed in various saline, alkaline, and acid liquids, a slight rise of temperature takes place; the solutions already employed, in which such a result occurs, are enumerated.

bichromates in carbon printing, and by Edwin Cocking, on non-converging perpendiculars in architectural photographs. Dr. Monckhoven, in his paper, asserts that neither hot water nor alum fix carbon prints, and although excess of bichromate of potash is removed, still the chromic salt, which has rendered the gelatine insoluble, not only remains, but undergoes a change by subsequent exposure to light, and thus accelerates the action of light upon the organic colour of the pigment, which fades rapidly. He suggests a new fixing agent, bisulphite of soda, and for colour some of the oxides of iron, mixed when moist, with glycerine and gelatine, which he states are absolutely unalterable by exposure to light.

EDINBURGH

Royal Society, March 8.—Sir William Thomson in the chair.—Prof. Tait read a paper on thermal conductivity, the result of experiments during the last ten years. His results for iron are much the same as those obtained by Principal Forbes. He had solved the following problems:—1. That, with the exception of iron, in no case as yet tried does a pure metal diminish in thermal conductivity as the temperature rises. 2. That different specimens of the same metal, as, for instance, two kinds of copper differ much the same relatively in thermal and in electric conductivity. 3. A substance which is pretty constant as a conductor of electricity is also pretty constant in thermal conductivity. Among the difficulties encountered was the alteration of the zero point of the thermometers used—Kew standards—after being heated to a high temperature. This affects only the absolute values slightly, but not the general character of the results. Another difficulty was the oxidation, during heating, of the short bars employed to measure the heat lost by radiation and convection at different temperatures. This was almost completely overcome.—Prof. Fleeming Jenkin and Mr. J. A. Ewing communicated a paper on the wave forms of articulate sounds obtained by the aid of the phonograph. Their results show that Helmholtz's theory of vowel sounds, viz., that for the production of any one vowel certain fixed notes are necessary, is not tenable, as they obtained vowel sounds under circumstances which rendered the presence of some of these notes impossible. They have also made out that every vowel and every consonant is reversible. This is true also of such single sounds as *ng*, *th*, *ch*, &c. A number of curves were exhibited showing the form of the indentations on tinfoil produced by various articulate sounds, multiplied about 400 times by means of a system of levers.—A paper by Mr. George M'Gowan on the action of the chlorides of iodine on acetylene and ethylene, was read by Mr. J. Y. Buchanan.

PARIS

Academy of Sciences, April 1.—M. Fizeau in the chair.—The following papers were read:—On some applications of elliptic functions (continued), by M. Hermite.—Parameters of elasticity of solids, and their experimental determination, by M. de Saint-Venant.—On the specific heats and the heat of fusion of gallium, by M. Berthelot. The liquid specific heat was found to be 0·0802; the solid, 0·079. Referred to 69·9 as the atomic weight, the heat of fusion was 1·33 cal. As with mercury, lead, tin, and bismuth, the solid and liquid specific heats, taken at the same temperature, are closely alike. The specific atomic heat of gallium (liquid 5·59, solid 5·52) is about the same as that of aluminium (5·53) and that of glucinium (5·64).—Action of oxygen on acid chlorides, bromides, and iodides; compounds of aluminium, by M. Berthelot.—On the movements of storms, by M. Faye.—On the whirlpools of watercourses, by M. Belgrand. He notices some phenomena of streams as illustrating M. Faye's theory.—Observations on the nature of the plants collected in the group of *Nœggerathia;* types of *N. flabellata*, Lindl. and Hutt., and *N. cyclopteroides*, Gœpp., by M. de Saporta.—The conidia of *Polyporus sulfureus*, Bull, and their development, by M. de Seynes.—Action of the sun on the magnetic and electric fluids of the earth, by M. Quet. The subject is treated mathematically.—On the linear differential equation which connects with the modulus the complete function of the first species, by M. Tannery.—On the kinematics of continuous figures on curved surfaces, and, in general, in plane or curved varieties, by M. Levy.—Actinometric measurements made in Algeria during the summer of 1877, by M. Violle. These were partly made in the dry Saharan climate of Laghouat, 466 kilom. south of Algiers, partly at Fagrait, a height of 993 m., and at Khanza, 740 m. lower. The method was the same as M. Violle used on the top of Mont Blanc two years ago. The numbers obtained for the solar constant in the former case, by Pouillet's and Forbes' formulæ, were 2·40 and 2·42; both less than 2·54, the value got on the top of Mont Blanc. The ratio of the intensities of solar radiation in the plain and on the mountain was 0·915.—On astronomical refraction, by M. Makarevitsch.—On the physical properties and the specific heat of glucinium, by MM. Nilson and Pettersson. They obtained large quantities of crystalline glucinium by heating to a red heat a cylindrical mass of iron, containing, in a hole closed with a screw, some of the chloride and some sodium freed from its oil of naphtha. The compound of marine salt and glucinium found after cooling, is washed with water, and the reduced metal (impure) appears in bright spangles, or dendrites, or small globules. The density of pure glucinium is calculated to be 1·64; specific heat 0·4084. The atomic weight Be = 13·8, and the formula for the oxide Be_2O_3 (assigned by Berzelius) are confirmed.—On a reaction peculiar to some polyatomic alcohols, by M. Klein. It is shown that all the ethers of mannite and its derivatives possess rotatory power.—On a new method of separation of arsenic from other metals, by MM. De Clermont and Frommel. This is based on the fact that while a large number of hydrates of sulphides are dissociated at 100° into sulphuretted hydrogen and oxide, sulphide of arsenic is the only one which gives a soluble oxide, arsenious acid. Hence, if a mixture of sulphide of arsenic and other sulphides be brought to boiling, the sulphides will all be oxidised, and remain insoluble in the water, except arsenious acid, which may then be easily isolated.—On melilotol, by Mr. Phipson. This is a new oily product got by distilling with water, dried *Melilotus officinalis*, then treating the distilled water with ether which dissolves the substance, so that it is got very pure after evaporation. To it is due the odour of melilot and hay.—Telephone employed as galvanoscope, by M. D'Arsonval. The worst constructed instrument is found to be at least 100 times more sensitive than the nerve for revealing weak electric tensions. It is very well adapted for studying the electric tetanus of muscle.—On anthrax in the horse and the dog; phlogogenic action of anthracic blood, by M. Toussaint. The phlogogenic matter accompanying the bacterides is more or less active according to the source whence these latter come.—On the epoch of formation of the cloaca in the embryo of the common fowl, by M. Cadiat.

GÖTTINGEN

Royal Society of Sciences, January 5.—On a class of differential equations which are integrable by Abel's or elliptic functions, by M. Fuchs.—On the affinities and systematic significance of *Ceroxylon andicola*, by M. Drude.—Some words on the origin of language, by M. Benfey.

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